

## **LISTING OF THE CLAIMS:**

Claims 1-6 (Cancelled).

7. (New) A knee prosthesis, which is implantable in the knee joint of a patient, said prosthesis comprising a femoral component (1), which is selected from the group of materials consisting of metal and ceramics and is implantable in the femur of the knee joint; a tibial component (2) which is selected from the group of materials consisting of metal and ceramics and is implantable in the tibia of the knee joint; and an intermediate insert (3) constituted of a plastic material which is interposed between the tibial component and the femoral component of said prosthesis, said insert being selectively rigidly integral with the tibial component or movable in rotation about a vertical axis relative to the tibial component, said femoral component comprising two lateral parts (7), each with a condylar surface which bears against and is movable in two lateral cavities (8) of a complementary profile provided in the insert, and includes a hollowed central part (10) arranged between said lateral condylar parts and which bears on a projecting central part (9) of the insert, the projecting central part (9) of the surface of the insert (3), which is directed toward the femoral component (1) having a convex shape in a frontal plane, and a concave shape in a sagittal plane, the hollowed central part (10) of the femoral component (1) having a concave shape in a frontal

plane, and a convex shape in a sagittal plane extending from the front to the rear of the femur of the knee joint, so as to facilitate the component (1) straddling the projecting part (9) of the insert during relative displacements thereof and to cooperate cam-like therewith, said knee prosthesis having the surfaces of the femoral component (2) and of the insert (3) come into mutual contact during the relative movements between said components in the absence of any discontinuity or sharp edges and cooperate through the straddling of concave parts and convex parts during the entirety of these movements within, respectively, each of the sagittal and frontal planes, wherein transversely in a frontal plane, the contact surface of the insert (3), which is directed towards the complementary surface of the femoral component and coming into continuous medio-lateral contact with the femoral component (1) is a curve (S2) which includes a projecting central part (9) having an inwardly curved central portion possessing a convexity which is directed towards the femoral component and which connects tangentially on opposite sides thereof to lateral cavity (8) having a shape corresponding substantially with that of a therewith associated condylar part of the femoral component (1), forming an undulating curve across the entire extent thereof in the absence of any discontinuity or sharp edge, in a generally sinusoidal configuration, and wherein transversely in a frontal plane, the surface of the femoral component (1), which is directed towards the complementary surface of the insert coming into continuous medio-lateral contact with the insert (3) defines a curve (S1)

which includes a projecting central part (9) having a hollowed undulating shape with a concavity which is directed towards the insert and which connects tangentially on opposite sides thereof to the condylar parts (7) of the femoral component (1), forming an undulating curve in the absence of any discontinuity or sharp edge of generally a sinusoidal configuration across the entirety thereof, which follows the entire articular surface of the femoral component from its most frontal part to the rearmost part thereof and of the insert, the contact surface of the femoral component being defined by the combination of a spiral curve in the sagittal plane following an undulating curve of sinusoidal type in a frontal plane, the contact surface of the insert (3) being defined by the combination of a spiral curve in the sagittal plane and of an undulating curve of sinusoidal configuration in the frontal plane, said two surfaces being in a concave-convex engagement in each of said two planes, whereby the two surfaces provide for a continuous transverse medio-lateral contact from complete extension to complete flexion of the prosthesis.

8. (New) The prosthesis as claimed in Claim 7, wherein, in a frontal plane, the convex central projection (9) of the insert (3), which is directed toward the femoral component (1) connects to the hollowed lateral parts (8) of said insert (3) via a curvature of constant radius ( $R'_2$ ) extending from the front to the rear of said prosthesis.

9. (New) The prosthesis as claimed in Claim 8, wherein, in a frontal plane, the hollowed lateral part (10) of the femoral component (1) connects to the lateral parts (7) of said femoral component (1) via a curvature of constant radius ( $R_2$ ) extending from the front to the rear of said prosthesis.
10. (New) The prosthesis as claimed in Claim 7, wherein the condylar parts and the central part (10) of the femoral component (1) extending transversely through at least one sagittal plane, have the shape of a spiral of any geometrical form, and wherein extending transversely through a sagittal plane, the complementary condylar parts (8) and central part (9) of the insert (3) also have the shape of a spiral of any geometrical form.
11. (New) The prosthesis as claimed in Claim 7, wherein the projecting part (9) of the insert (3) and the hollowed part (10) of the intercondylar space of the femoral component (1) have, in the sagittal plane, two curvatures which cooperate cam-like, said cam-like motion being such that, at an angle of flexion of  $0^\circ$ , the center of the bearings of the femoral component against the insert is a few millimeters in front of the center of the insert (3), such that said center retreats a few millimeters behind the center of the insert, as the prosthesis enters into flexion.

12. (New) The prosthesis as claimed in Claim 7, wherein said prosthesis comprises:

a system with three zones of bearing between the femoral component (1) and the insert (3);

a system having medio-lateral continuity of the contact between the bearing surfaces of the femoral component (1) and of the insert (3);

a succession of concave or convex surface segments having the form of a spiral in profile;

the concave parts of the femoral surface corresponding to convex tori of the surface of the insert;

the convex parts of the femoral surface corresponding to concave tori of the surface of the insert (3);

in the frontal plane, a succession of fitting engagements of the femoral component in the insert, which are successively convex-concave, then concave-convex, extending from the medial condyle to the lateral condyle; and the three surfaces of the femoral component (1), medial, central and lateral, defining, when viewed in the sagittal plane, a downwardly directed convexity, whereas the three surfaces of the insert (3) have an upwardly directed concavity, so as to provide a central zone of saddle shape but facilitating a continuous medio-lateral contact.

13. (New) The prosthesis as claimed in Claim 7, wherein said metals are selected from the group of materials consisting of chromium-cobalt, titanium, stainless steel and alloys of said metals.
14. (New) The prosthesis as claimed in Claim 7, wherein the plastic material of said insert (3) consists essentially of polyethylene.
15. (New) A knee prosthesis, which is implantable in the knee joint of a patient, said prosthesis comprising a femoral component (1), which is selected from the group of materials consisting of metal and ceramics and is implantable in the femur of the knee joint; a tibial component (2) which is selected from the group of materials consisting of metal and ceramics and is implantable in the tibia of the knee joint; and an intermediate insert (3) constituted of a plastic material which is interposed between the tibial component and the femoral component of said prosthesis, said insert being selectively rigidly integral with the tibial component or movable in rotation about a vertical axis relative to the tibial component, said femoral component comprising two lateral parts (7), each with a condylar surface which bears against and is movable in two lateral cavities (8) of a complementary profile provided in the insert, and includes a hollowed central part (10) arranged between said lateral condylar parts and which bears on a projecting central part (9) of the insert, the projecting central part (9) of the surface of the insert (3), which is directed toward the femoral component (1) having a

convex shape in a frontal plane, and a concave shape in a sagittal plane, the hollowed central part (10) of the femoral component (1) having a concave shape in a frontal plane, and a convex shape in a sagittal plane extending from the front to the rear of the femur of the knee joint, so as to facilitate the component (1) straddling the projecting part (9) of the insert during relative displacements thereof and to cooperate cam-like therewith, said knee prosthesis having the surfaces of the femoral component (2) and of the insert (3) come into mutual contact during the relative movements between said components in the absence of any discontinuity or sharp edges and cooperate through the straddling of concave parts and convex parts during the entirety of these movements within, respectively, each of the sagittal and frontal planes, wherein transversely in a frontal plane, the contact surface of the insert (3), which is directed towards the complementary surface of the femoral component and coming into continuous medio-lateral contact with the femoral component (1) is a curve (S2) which includes a projecting central part (9) having an inwardly curved central portion possessing a convexity which is directed towards the femoral component and which connects tangentially on opposite sides thereof to lateral cavity (8) having a shape corresponding substantially with that of a therewith associated condylar part of the femoral component (1), forming an undulating curve across the entire extent thereof in the absence of any discontinuity, flats or sharp edge, in a generally sinusoidal configuration, and wherein transversely in a frontal plane, the surface of the femoral component (1), which is directed towards the complementary

surface of the insert coming into continuous medio-lateral contact with the insert (3) defines a curve (S1) which includes a projecting central part (9) having a hollowed undulating shape with a concavity which is directed towards the insert and which connects tangentially on opposite sides thereof to the condylar parts (7) of the femoral component (1), forming an undulating curve in the absence of any discontinuity, flats or sharp edge of generally a sinusoidal configuration across the entirety thereof, which follows the entire articular surface of the femoral component from its most frontal part to the rearmost part thereof and of the insert.

16. (New) The prosthesis as claimed in Claim 15, wherein, in a frontal plane, the convex central projection (9) of the insert (3), which is directed toward the femoral component (1) connects to the hollowed lateral parts (8) of said insert (3) via a curvature of constant radius ( $R'_2$ ) extending from the front to the rear of said prosthesis.
17. (New) The prosthesis as claimed in Claim 16, wherein, in a frontal plane, the hollowed lateral part (10) of the femoral component (1) connects to the lateral parts (7) of said femoral component (1) via a curvature of constant radius ( $R_2$ ) extending from the front to the rear of said prosthesis.



18. (New) A knee prosthesis, which is implantable in the knee joint of a patient, said prosthesis comprising a femoral component (1), which is selected from the group of materials consisting of metal and ceramics and is implantable in the femur of the knee joint; a tibial component (2) which is selected from the group of materials consisting of metal and ceramics and is implantable in the tibia of the knee joint; and an intermediate insert (3) constituted of a plastic material which is interposed between the tibial component and the femoral component of said prosthesis, said insert being selectively rigidly integral with the tibial component or movable in rotation about a vertical axis relative to the tibial component, said femoral component comprising two lateral parts (7), each with a condylar surface which bears against and is movable in two lateral cavities (8) of a complementary profile provided in the insert, and includes a hollowed central part (10) arranged between said lateral condylar parts and which bears on a projecting central part (9) of the insert, the projecting central part (9) of the surface of the insert (3), which is directed toward the femoral component (1) having a convex shape in a frontal plane, and a concave shape in a sagittal plane, the hollowed central part (10) of the femoral component (1) having a concave shape in a frontal plane, and a convex shape in a sagittal plane extending from the front to the rear of the femur of the knee joint, so as to facilitate the component (1) straddling the projecting part (9) of the insert during relative displacements thereof and to cooperate cam-like therewith, said knee prosthesis having the surfaces of the femoral component (2) and of the insert (3) come into mutual contact during the relative movements between said

components in the absence of any discontinuity or sharp edges and cooperate through the straddling of concave parts and convex parts during the entirety of these movements within, respectively, each of the sagittal and frontal planes, wherein transversely in a frontal plane, the contact surface of the insert (3), which is directed towards the complementary surface of the femoral component and coming into continuous medio-lateral contact with the femoral component (1) is a curve (S2) which includes a projecting central part (9) having an inwardly curved central portion possessing a convexity which is directed towards the femoral component and which connects tangentially on opposite sides thereof to lateral cavity (8) having a shape corresponding substantially with that of a therewith associated condylar part of the femoral component (1), forming an undulating curve in a generally sinusoidal configuration, and wherein transversely in a frontal plane, the surface of the femoral component (1), which is directed towards the complementary surface of the insert coming into continuous medio-lateral contact with the insert (3) defines a curve (S1) which includes a projecting central part (9) having a hollowed undulating shape with a concavity which is directed towards the insert and which connects tangentially on opposite sides thereof to the condylar parts (7) of the femoral component (1), forming an undulating curve in the absence of any discontinuity or sharp edge of generally a sinusoidal configuration, which follows the entire articular surface of the femoral component from its most frontal part to the rearmost part thereof and of the insert, the femoral contact surface of the femoral component being defined by the combination of

a spiral curve in the sagittal plane following an undulating curve of sinusoidal type in a frontal plane, the contact surface of the insert (3) being defined by the combination of a spiral curve in the sagittal plane and of an undulating curve of sinusoidal configuration in the frontal plane, said two surfaces being in a concave-convex engagement in each of said two planes, whereby the two surfaces provide for a continuous transverse medio-lateral contact from complete extension to complete flexion of the prosthesis.

19. (New) The prosthesis as claimed in Claim 18, wherein, in a frontal plane, the convex central projection (9) of the insert (3), which is directed toward the femoral component (1) connects to the hollowed lateral parts (8) of said insert (3) via a curvature of constant radius ( $R'_2$ ) extending from the front to the rear of said prosthesis.
20. (New) The prosthesis as claimed in Claim 19, wherein, in a frontal plane, the hollowed lateral part (10) of the femoral component (1) connects to the lateral parts (7) of said femoral component (1) via a curvature of constant radius ( $R_2$ ) extending from the front to the rear of said prosthesis.

21. (New) The prosthesis as claimed in Claim 18, wherein the condylar parts and the central part (10) of the femoral component (1) extending transversely through at least one sagittal plane, have the shape of a spiral of any geometrical form, and wherein extending transversely through a sagittal plane, the complementary condylar parts (8) and central part (9) of the insert (3) also have the shape of a spiral of any geometrical form.